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scheme of phylogeny is to be counted a step in advance, even though it be replaced by another imperfect one. The authors are, therefore, quite justified in giving the concise review and criticism of current views of the phylogeny of vascular plants that is to be found in chapter XV. Very important also, in its bearing on this subject, is the presentation of the leading facts of the anatomy of the vascular plants, given in the two concluding chapters of the book by professor Edward C. Jeffrey, of Harvard University.

The well arranged and efficiently complete bibliographies are sure to prove a most valuable feature of the book to investigators. An adequate series of figures has been well selected from many sources, and they are admirably executed, excepting perhaps the never-satisfying photomicrographs of the embryo-sac.—D. S. JOHNSON.

Experimental morphology.

THE LITERATURE of experimental morphology has received an important addition by Dr. Klebs. The present publication[2] is really a continuation of his older work (1896) on the physiology of reproduction in algae and fungi, and carries the theoretical as well as the experimental side of the subject of reproduction and development into higher plants. Beginning with a short history of the development of this branch of botany, from the time of Knight forward, the introduction proceeds with definition and discussion of such subjects as specific structure, causality, external and internal conditions, the teleological point of view, etc. As would be expected, this author does not regard a teleological explanation as any explanation at all. His clear exposition of the purely objective method of interpretation will doubtless be a great help to students who have difficulty in breaking away from the sometime prevalent teleology. His discussion of external and internal conditions is hardly satisfactory, however; one feels that, after all, the division, convenient as it may be, is an arbitrary one. Indeed, to the reviewer it seems as though we might soon be able to discard both terms altogether, naming a stimulus where we have come to know it and confessing ignorance where it is still outside our knowledge. A physiology based on study of the protoplasm can hardly make a distinction between external and internal factors; the cell sap is physiologically as much external to the organism as is the atmospheric air, and the protoplasm itself is probably made up of a number of different systems, often external to one another, and influencing one another in many ways.

Klebs describes several new and instructive experiments with *Ajuga reptans*, *Glechoma hederacea*, *Veronica chamaedrys*, and others. By darkness, rather high temperature, and plenty of moisture, cuttings of the flowering shoot of *Ajuga reptans* were transformed into runners, producing rosettes instead of the normal floral bracts and flowers. Also, a runner submerged in water grows erect to the surface of the medium and then returns to its horizontal habit. Flowering shoots of *Veronica chamaedrys* were made to take the form of an ordinary vegetative shoot by growing them as cuttings in moist air. Many other fascinating experiments are described.

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[2] KLEBS, G., Willkürliche Entwicklungsänderungen bei Pflanzen. pp. iv+166. *figs. 28*. Jena: Gustav Fischer. 1903.

The book is full of suggestive theoretical discussions. In the author's interpretation of these phenomena of higher plants, the responses already obtained in lower plants are taken into account. Thus, the whole manner of treatment is one based on the physiology of the cell itself. On the whole, the work is an admirable one and one which will immediately take its place alongside Dr. Klebs's earlier treatise as among the first to present the subject of development from the standpoint of objective physiology.—BURTON E. LIVINGSTON.

MINOR NOTICES.

THE THIRD PART of Maiden's Revision of the genus Eucalyptus[3] contains text and figures for *Eucalyptus calycogona* Turcz.—C. R. B.

THE SIXTEENTH PART of Engler's *Das Pflanzenreich* includes a conspectus of the families Scheuchzeriaceae, Alismataceae, and Butomaceae by Fr. Buchenau.[4]—C. R. B.

"WITH THE TREES"[5] is the title of a recent book which furnishes evidence of the increasing popular interest in the trees and forests. Such subjects as: When the sap stirs, The life of leaves, The work of leaves, In the high woods, In a hillside pasture, Trees of streets, parks, and gardens, are very interestingly treated by the author. The book indicates a thorough knowledge and familiarity with the botanical problems discussed. The usual tendency of popular writers to personify plants is carried to an extreme in many cases. While this may lend a certain vivacity to the style, the practice is unfortunate, because it conveys erroneous impressions of the life-processes and of the probable origin of structures in plants. The book is very well illustrated from photographs by Edmund H. Lincoln and C. B. Going.—CLIFTON D. HOWE.

THE STUDY of the life-history of truffles has lately engaged the attention of several French investigators. On December 10, 1900, M. Émile Boulanger deposited with the Paris Academy of Science a sealed paper, which was opened at his request on May 4, 1903. It contained a description of his success in germinating the ascospores of *Tuber melanosporum* and *T. uncinatum*. He further described the mycelium, and a conidial stage, and announced

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[3] MAIDEN, J. H., A critical revision of the genus Eucalyptus. Part III. pp. 77–90. *pls. 9–12*. Published by the Government of the state of New South Wales. Sydney: W. A. Gullick. 1903. 2*s*. 6*d*.

[4] ENGLER, A., Das Pflanezenreich. Heft 16. Scheuchzeriaceae (pp. 19), Alismataceae (pp. 66), und Butomaceae (pp. 12), von Fr. Buchenau. Leipzig: Wilhelm Engelmann. 1903. *M*. 5.

[5] GOING, MAUD, With the trees. 12mo. pp. x+335. *figs. 40*. New York: The Baker and Taylor Co. 1903. $1.00.